manufacturing plant. This approach is widely used in many LCA studies. It is easily applicable to both background system, such as electrical power generation system and foreground system, such as manufacturing plant under investigation. This approach requires less information on a process than the quasi-microscopic/microscopic approaches (→ *Table 5*).

In the quasi-microscopic/microscopic approach, a manufacturing plant is subdivided into two or three sub-processes and there may be a joint sub-process, a physically separated sub-process and/or a fully separated sub-process. The unit process becomes a sub-process in the quasi-microscopic approach, while it is an operational unit (such as a distillation column) in the microscopic approach. The quasi-microscopic/microscopic approach is very difficult for application to a background system because the background systems usually suffer from a lack of information. However, this can be solved if every industrial sector performs the allocation procedure by the quasi-microscopic/microscopic approach.

Though the quasi-microscopic/microscopic approach requires more information, it may not be very much more time or cost intensive. These improved allocation approaches can reduce the allocation procedure errors that might be based on a value judgement. Furthermore, if the multi-output process in a LCA study is in the foreground system, the microscopic approach is very useful in identifying key issues related with one product/function and improving the environmental performance of a process.

In the ammonia manufacturing process, the quasi-microscopic and the microscopic approaches give the same results. However, results from these two approaches can be different in other cases. A fully separated operational unit, which is in the physically separated sub-process can avoid the allocation procedure in the microscopic approach, but not in the quasi-microscopic approach. Therefore, the microscopic approach is recommended in the multi-output process due to the degree of the aggregation of operational units and the ability to minimize the number of the environmental burdens that must be allocated. As such, the microscopic approach would more clearly reflect the actual chemical product sources of energy needs or process chemical emission. The microscopic approach is also the obvious alternative in the rule-based LCI methodology as a full unit process accounting is provided. Thus, the microscopic approach facilitates the LCI of chemical and pharmaceutical products.

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News & Views: Guidelines for Implementation of Eco-indicator 99 with the Swiss ETH-database available

In 1999 the new method "Eco-indicator 99" for life cycle impact assessment has been introduced. The method has got much attention in the mean time. In order to use this method with existing LCI (life cycle inventory) databases it is necessary to assign the new damage factors to the resources and pollutants reported in these LCI databases. One of the widely distributed databases for background processes is the Swiss "Ökoinventare von Energiesystemen".

Our paper **"Eco-indicator 99 Implementation: Assignment of Damage Factors to the Swiss LCI database 'Ökoinventare von Energiesystemen'"** aims to link the new impact assessment method Eco-indicator 99 to the ETH-database in order to facilitate the usage and to avoid discrepancies due to misunderstandings or different interpretations of the original reports. The work consists of a short background paper and an Excel worksheet with all information about the prerequisites for the assignment. New Eco-indicator 99 scores have been extrapolated for some substances contributing to greenhouse effect, ozone depletion, acidification, ionising radiation and ecotoxicity. The damage factors from the Excel worksheet can be directly linked to results of the ETH-database.

The background paper and the Excel worksheet are available from ESU-services for 98 CHF. Please send your order with your full address to

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